TOTAL DOSE IRRADIATION TEST REPORT

LM139AJ (*DC9709*)

QUAD VOLTAGE COMPARATOR

from

National Semiconductor

Reference : TRAD/LM139AJ/DC9709/FR 37192	*Montpellier, 10 February 1998*

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To:
MATRA MARCONI SPACE
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From:
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SUMMARY

1. Introduction

This report presents the total dose irradiation test results of Quad Voltage Comparator LM139AJ (DC9709) from NSC.

The tests were conducted in respect of 5962-9673801VCA specification.

2. Parts References

REFERENCES	
Type:	LM139 AJ
Manufacturer:	NATIONAL SEMICONDUCTOR
Packaging:	DIL14
TECHNOLOGY	
Bipolar	
PARTS PROCUREMENT	
Origin:	MATRA CPPA (AGLIGNE)
Level:	S
Date Code:	9709
Wafer lot:	/
F.R. :	37192
Number of Parts	10 irradiated + 1 reference
DETAIL SPECIFICATION	
5962-9673801VCA	

3. Dosimetry and irradiation facilities

IRRADIATION FACILITY	
Source :	^{60}Co
Localisation :	Montpellier.
Dose rate :	350cGy(Si) per hour (0.35 kRad/h).
Irradiation box :	(20 x 20 x 2 cm^3), Pb (1,5 mm)/Al (1 mm)
Dosimetry :	TLD (CaF_2), with Harshaw 2000.
IRRADIATION TIMING	
Total dose limit :	100 kcGy(Si) (1 kcGy(Si)=1kRad(Si))
Level for measurement :	0, 10, 15, 2**3**, 50, 7**2**, **99** kcGy(Si) (or kRad)

4. Electrical parameters

See appendix 1, the MATRA MARCONI SPACE test plan for the list of electrical parameter.
See appendix 2 for electrical measurement specification.

5. Bias conditions

All components are biased following biasing condition figure in MATRA MARCONI SPACE test plan :

PARTS IDENTIFICATION

Manufacturer ********
Marking:

Serial Numbers	Sample Devices										Control
Manufacturer	217	x	x	x	x	x	x	x	221	226	227
Irr. Marking	1	2	3	4	5	6	7	8	9	10	0
Biasing Mode	On	On	On	On	On	On	On	On	Off	Off	Unbiased

BIASING CONDITIONS

Schéma de polarisation à mettre ici

COMMENTS

8 Parts biased in Static On Mode, 2 parts biased in off mode, with all pins connected to ground.

6. Results

Comments:

- For parts biased on:

The Input Bias Current + and - are out of Specification at 10 krad.
The Input Offset Current is Out of Specification at 55 krad.
The Voltage Gain is Out of Specification at 15 krad.
The Input Offset Voltage is Out of Specification at 10 krad, only for the Out1.

- For parts biased off:

The Input Bias Current + and - are out of Specification at 35 krad.
The Input Offset Current is Out of Specification at 55 krad, for the Out1.
The Voltage Gain is Out of Specification at 50 krad, for the Out3 .

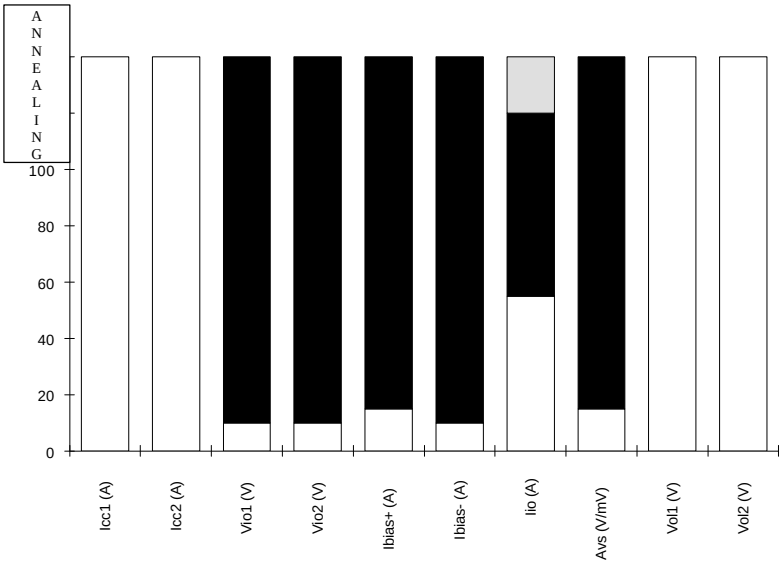
7. Conclusions

Total dose steady-state irradiation test using gamma rays from Cobalt 60 has been carried out on 10 (8 Static On and 2 Off) **Quad Voltage Comparator LM139AJ (DC 9709A)** from **national Semiconductor** at low dose rate (≤0.35 kRad/h) up to 100 kRad.

The results indicate that:

- Parts are fully functional, up to the last step at 100 kRad.
- The first parameter which overstep specification is Ibias+ at 10 kRad.
- Biasing mode influence : *****.

7.1. ELECTRICAL PARAMETERS FOR OUT1 OF PARTS BIASED ON

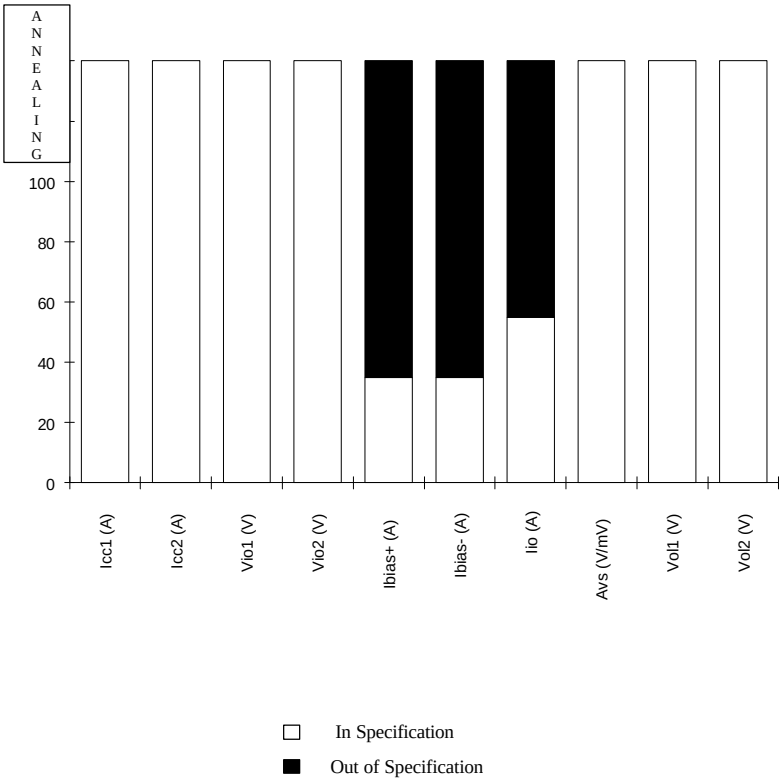


In Specification

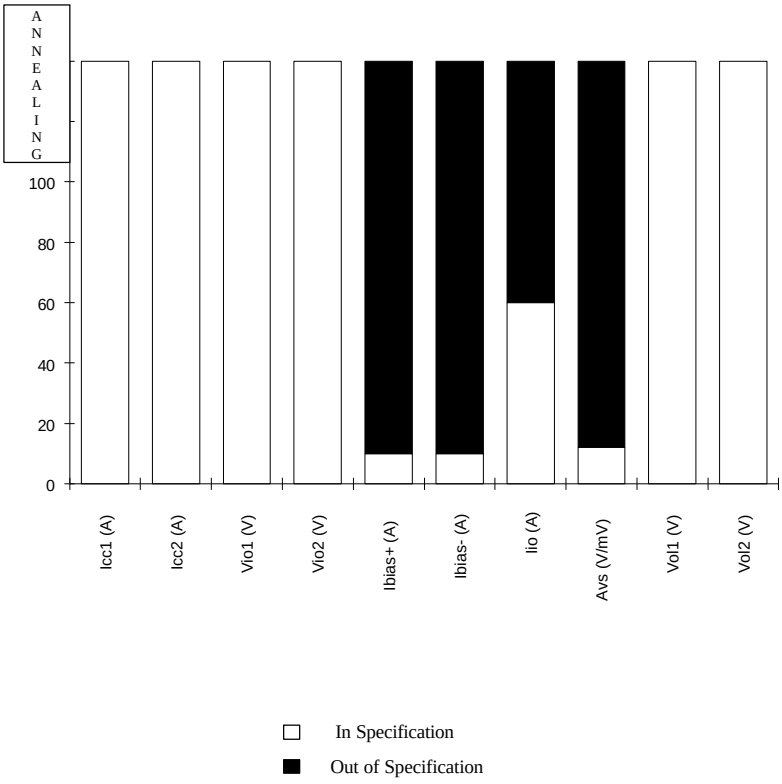
Out of Specification

Transition

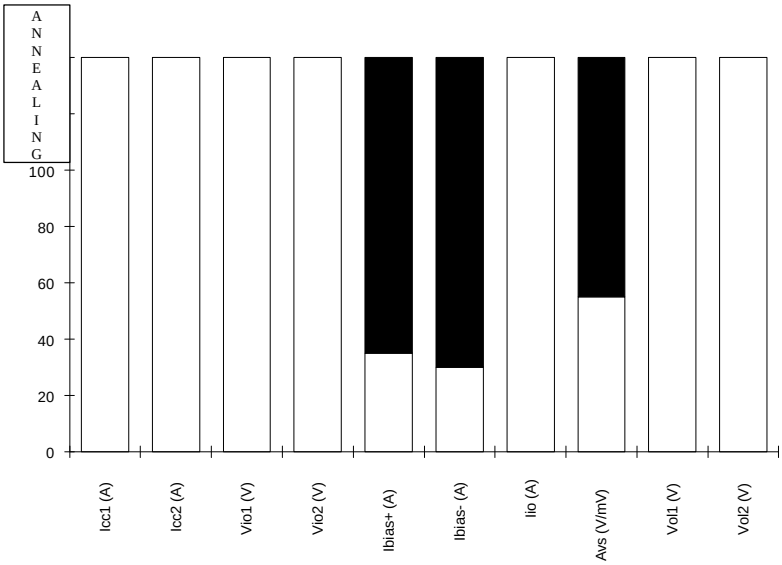
7.2. ELECTRICAL PARAMETERS FOR OUT1 OF PARTS BIASED OFF



7.3. ELECTRICAL PARAMETERS FOR OUT3 OF PARTS BIASED ON



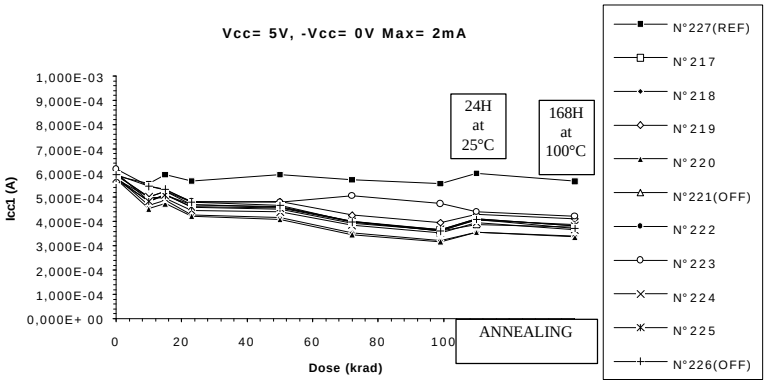
7.4. ELECTRICAL PARAMETERS FOR OUT3 OF PARTS BIASED OFF



□ In Specification

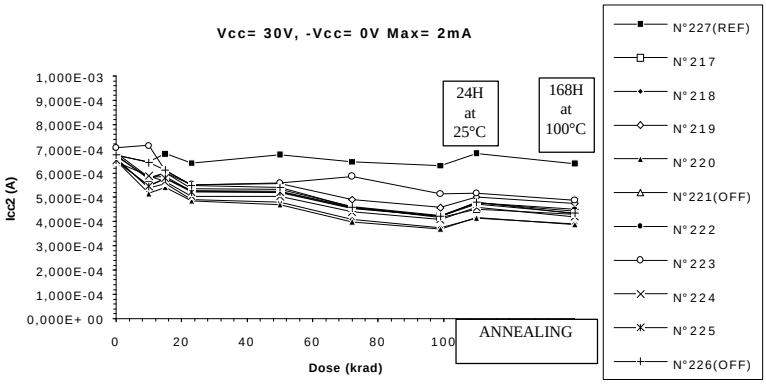
■ Out of Specification

7.5. Icc1 (A)



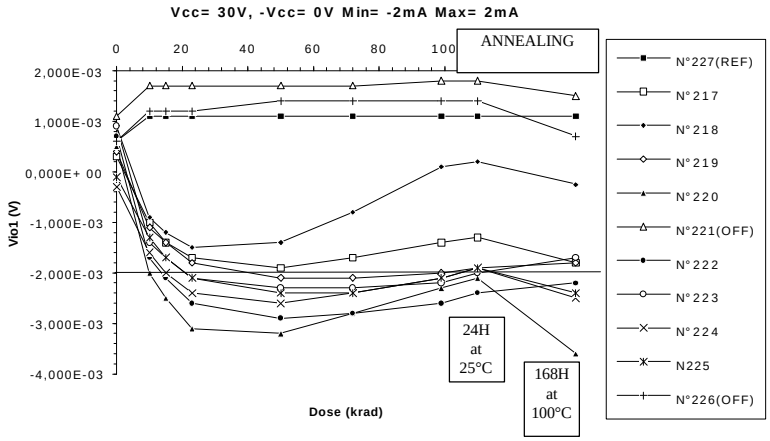
Icc1 (A)	Vcc=5V, -Vcc=0V Max=2mA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	5,881E-04	5,579E-04	5,946E-04	5,673E-04	5,948E-04	5,730E-04	5,577E-04	5,994E-04	5,663E-04
N°217	5,723E-04	4,861E-04	5,100E-04	4,687E-04	4,598E-04	4,018E-04	3,626E-04	3,891E-04	3,765E-04
N°218	5,842E-04	4,663E-04	4,886E-04	4,271E-04	4,159E-04	3,536E-04	3,224E-04	3,551E-04	3,396E-04
N°219	5,936E-04	5,020E-04	5,263E-04	4,808E-04	4,843E-04	4,262E-04	3,960E-04	4,292E-04	4,113E-04
N°220	5,764E-04	4,529E-04	4,741E-04	4,231E-04	4,087E-04	3,467E-04	3,176E-04	3,568E-04	3,365E-04
N°221(OFF)	5,905E-04	5,017E-04	5,252E-04	4,702E-04	4,611E-04	4,012E-04	3,671E-04	4,108E-04	3,824E-04
N°222	6,011E-04	4,855E-04	5,108E-04	4,594E-04	4,516E-04	3,926E-04	3,629E-04	4,069E-04	3,892E-04
N°223	6,169E-04	5,457E-04	5,295E-04	4,826E-04	4,813E-04	5,066E-04	4,740E-04	4,405E-04	4,217E-04
N°224	5,748E-04	5,026E-04	4,965E-04	4,462E-04	4,403E-04	3,852E-04	3,547E-04	3,964E-04	3,669E-04
N°225	5,795E-04	4,839E-04	5,101E-04	4,619E-04	4,558E-04	3,984E-04	3,676E-04	4,105E-04	3,817E-04
N°226(OFF)	5,931E-04	5,472E-04	5,341E-04	4,799E-04	4,662E-04	3,975E-04	3,621E-04	4,095E-04	3,723E-04

7.6. Icc2 (A)



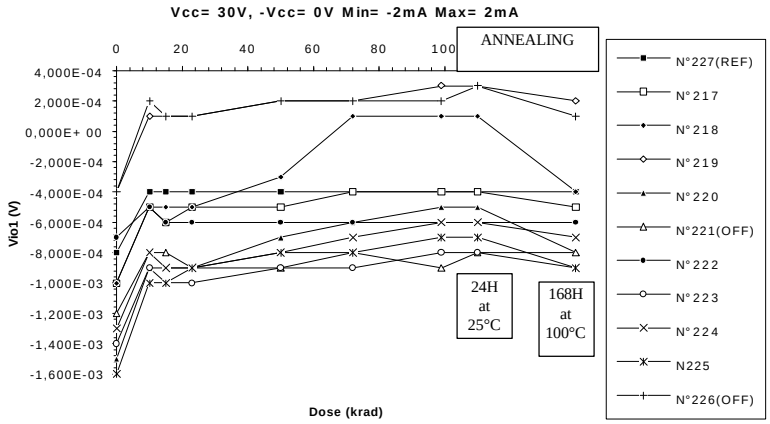
Icc2 (A)	Vcc=30V, -Vcc=0V Max=2mA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	6,737E-04	6,463E-04	6,798E-04	6,412E-04	6,765E-04	6,467E-04	6,303E-04	6,815E-04	6,398E-04
N°217	6,500E-04	5,483E-04	5,782E-04	5,282E-04	5,248E-04	4,584E-04	4,166E-04	4,515E-04	4,315E-04
N°218	6,626E-04	5,372E-04	5,579E-04	4,920E-04	4,797E-04	4,086E-04	3,743E-04	4,155E-04	3,917E-04
N°219	6,757E-04	5,742E-04	6,030E-04	5,517E-04	5,575E-04	4,899E-04	4,581E-04	5,006E-04	4,757E-04
N°220	6,508E-04	5,165E-04	5,409E-04	4,849E-04	4,707E-04	3,997E-04	3,681E-04	4,159E-04	3,874E-04
N°221(OFF)	6,711E-04	5,817E-04	6,022E-04	5,365E-04	5,322E-04	4,622E-04	4,254E-04	4,789E-04	4,436E-04
N°222	6,840E-04	5,833E-04	5,864E-04	5,247E-04	5,233E-04	4,568E-04	4,228E-04	4,769E-04	4,503E-04
N°223	7,058E-04	7,138E-04	6,106E-04	5,530E-04	5,592E-04	5,872E-04	5,145E-04	5,174E-04	4,889E-04
N°224	6,479E-04	5,889E-04	5,641E-04	5,050E-04	5,037E-04	4,403E-04	4,079E-04	4,582E-04	4,208E-04
N°225	6,535E-04	5,471E-04	5,788E-04	5,216E-04	5,206E-04	4,549E-04	4,221E-04	4,737E-04	4,367E-04
N°226(OFF)	6,751E-04	6,444E-04	6,136E-04	5,482E-04	5,397E-04	4,604E-04	4,221E-04	4,796E-04	4,341E-04

7.7. Vio1 (V) Out1



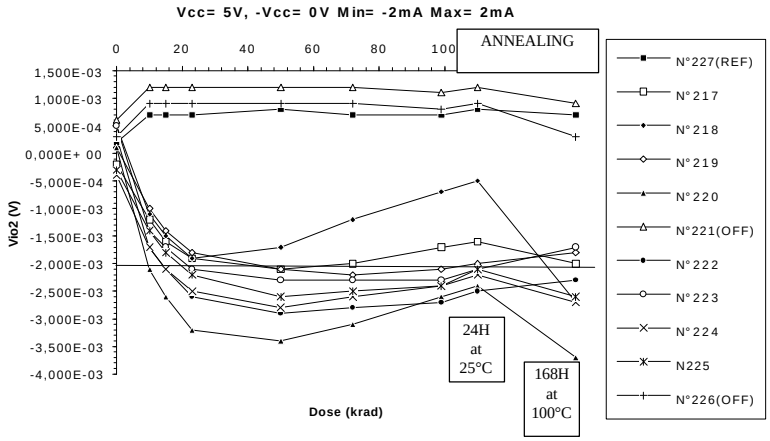
Vio1 (V)	Vcc=30V, -Vcc=0V Min=-2mA Max=2mA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	6,000E-04	1,100E-03	1,100E-03	1,100E-03	1,100E-03	1,100E-03	1,100E-03	1,100E-03	1,100E-03
N°217	3,000E-04	-1,000E-03	-1,400E-03	-1,700E-03	-1,900E-03	-1,700E-03	-1,400E-03	-1,300E-03	-1,800E-03
N°218	9,000E-04	-9,000E-04	-1,200E-03	-1,500E-03	-1,400E-03	-8,000E-04	1,000E-04	2,000E-04	-2,500E-04
N°219	4,000E-04	-1,100E-03	-1,400E-03	-1,800E-03	-2,100E-03	-2,100E-03	-2,000E-03	-1,900E-03	-1,800E-03
N°220	5,000E-04	-2,000E-03	-2,500E-03	-3,100E-03	-3,200E-03	-2,800E-03	-2,300E-03	-2,100E-03	-3,600E-03
N°221(OFF)	1,100E-03	1,700E-03	1,700E-03	1,700E-03	1,700E-03	1,700E-03	1,800E-03	1,800E-03	1,500E-03
N°222	7,000E-04	-1,700E-03	-2,100E-03	-2,600E-03	-2,900E-03	-2,800E-03	-2,600E-03	-2,400E-03	-2,200E-03
N°223	9,000E-04	-1,400E-03	-1,700E-03	-2,100E-03	-2,300E-03	-2,300E-03	-2,200E-03	-2,000E-03	-1,700E-03
N°224	-3,000E-04	-1,600E-03	-2,000E-03	-2,400E-03	-2,600E-03	-2,400E-03	-2,100E-03	-1,900E-03	-2,500E-03
N225	-1,000E-04	-1,300E-03	-1,700E-03	-2,100E-03	-2,400E-03	-2,400E-03	-2,100E-03	-1,900E-03	-2,400E-03
N°226(OFF)	6,000E-04	1,200E-03	1,200E-03	1,200E-03	1,400E-03	1,400E-03	1,400E-03	1,400E-03	7,000E-04

7.8. Vio1 (V) Out3



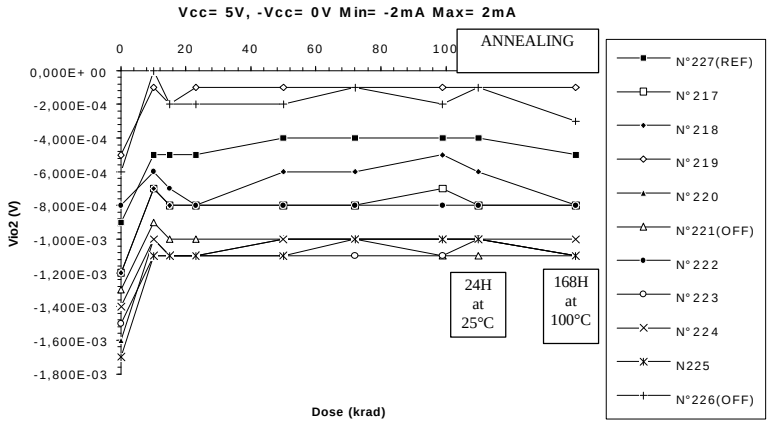
Vio1 (V)	Vcc=30V, -Vcc=0V Min=-2mA Max=2mA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	-8,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-4,000E-04
N°217	-1,000E-03	-5,000E-04	-6,000E-04	-5,000E-04	-5,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-5,000E-04
N°218	-1,000E-03	-5,000E-04	-5,000E-04	-5,000E-04	-3,000E-04	1,000E-04	1,000E-04	1,000E-04	-4,000E-04
N°219	-4,000E-04	1,000E-04	1,000E-04	1,000E-04	2,000E-04	2,000E-04	3,000E-04	3,000E-04	2,000E-04
N°220	-1,500E-03	-9,000E-04	-9,000E-04	-9,000E-04	-7,000E-04	-6,000E-04	-5,000E-04	-5,000E-04	-8,000E-04
N°221(OFF)	-1,200E-03	-8,000E-04	-8,000E-04	-9,000E-04	-9,000E-04	-8,000E-04	-9,000E-04	-8,000E-04	-8,000E-04
N°222	-7,000E-04	-5,000E-04	-6,000E-04	-6,000E-04	-6,000E-04	-6,000E-04	-6,000E-04	-6,000E-04	-6,000E-04
N°223	-1,400E-03	-9,000E-04	-1,000E-03	-1,000E-03	-9,000E-04	-9,000E-04	-8,000E-04	-8,000E-04	-9,000E-04
N°224	-1,300E-03	-8,000E-04	-9,000E-04	-9,000E-04	-8,000E-04	-7,000E-04	-6,000E-04	-6,000E-04	-7,000E-04
N225	-1,600E-03	-1,000E-03	-1,000E-03	-9,000E-04	-8,000E-04	-8,000E-04	-7,000E-04	-7,000E-04	-9,000E-04
N°226(OFF)	-4,000E-04	2,000E-04	1,000E-04	1,000E-04	2,000E-04	2,000E-04	2,000E-04	3,000E-04	1,000E-04

7.9. Vio2 (V) Out1



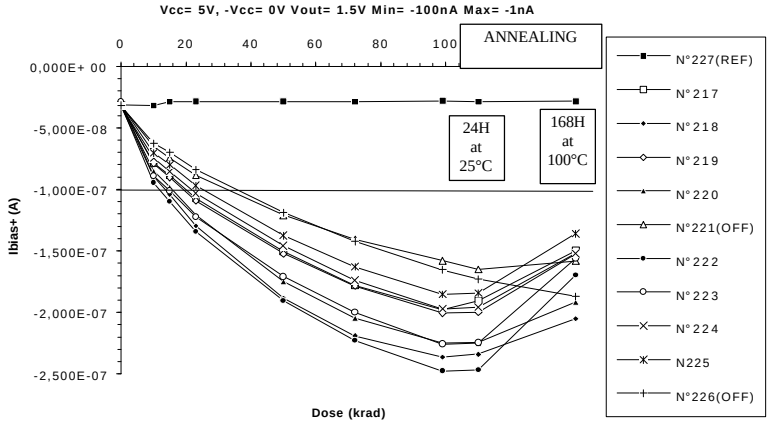
Vio2 (V)	Vcc=5V, -Vcc=0V Min=-2mA Max=2mA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	2,000E-04	7,000E-04	7,000E-04	7,000E-04	8,000E-04	7,000E-04	7,000E-04	8,000E-04	7,000E-04
N°217	-2,000E-04	-1,200E-03	-1,600E-03	-1,900E-03	-2,100E-03	-2,000E-03	-1,700E-03	-1,600E-03	-2,000E-03
N°218	5,000E-04	-1,100E-03	-1,500E-03	-1,900E-03	-1,700E-03	-1,200E-03	-7,000E-04	-5,000E-04	-2,700E-03
N°219	1,000E-04	-1,000E-03	-1,400E-03	-1,800E-03	-2,100E-03	-2,200E-03	-2,100E-03	-2,000E-03	-1,800E-03
N°220	1,000E-04	-2,100E-03	-2,600E-03	-3,200E-03	-3,400E-03	-3,100E-03	-2,600E-03	-2,400E-03	-3,700E-03
N°221(OFF)	6,000E-04	1,200E-03	1,200E-03	1,200E-03	1,200E-03	1,200E-03	1,100E-03	1,200E-03	9,000E-04
N°222	3,000E-04	-1,700E-03	-2,100E-03	-2,600E-03	-2,900E-03	-2,800E-03	-2,700E-03	-2,500E-03	-2,300E-03
N°223	5,000E-04	-1,400E-03	-1,700E-03	-2,100E-03	-2,300E-03	-2,300E-03	-2,300E-03	-2,100E-03	-1,700E-03
N°224	-4,000E-04	-1,700E-03	-2,100E-03	-2,500E-03	-2,800E-03	-2,600E-03	-2,400E-03	-2,200E-03	-2,700E-03
N225	-3,000E-04	-1,400E-03	-1,800E-03	-2,200E-03	-2,600E-03	-2,500E-03	-2,400E-03	-2,100E-03	-2,600E-03
N°226(OFF)	3,000E-04	9,000E-04	9,000E-04	9,000E-04	9,000E-04	9,000E-04	8,000E-04	9,000E-04	3,000E-04

7.10. Vio2 (V) Out3



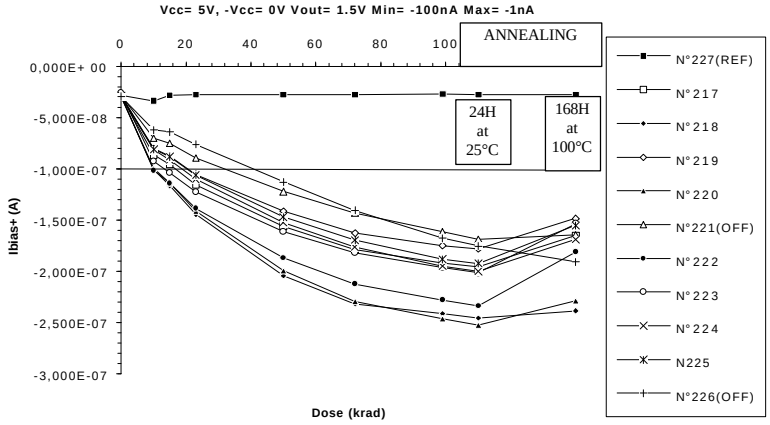
Vio2 (V)	Vcc=5V, -Vcc=0V Min=-2mA Max=2mA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	-9,000E-04	-5,000E-04	-5,000E-04	-5,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-4,000E-04	-5,000E-04
N°217	-1,200E-03	-7,000E-04	-8,000E-04	-8,000E-04	-8,000E-04	-8,000E-04	-7,000E-04	-8,000E-04	-8,000E-04
N°218	-1,200E-03	-7,000E-04	-8,000E-04	-8,000E-04	-6,000E-04	-6,000E-04	-5,000E-04	-6,000E-04	-8,000E-04
N°219	-5,000E-04	-1,000E-04	-2,000E-04	-1,000E-04	-1,000E-04	-1,000E-04	-1,000E-04	-1,000E-04	-1,000E-04
N°220	-1,600E-03	-1,000E-03	-1,100E-03	-1,100E-03	-1,000E-03	-1,000E-03	-1,000E-03	-1,000E-03	-1,100E-03
N°221(OFF)	-1,300E-03	-9,000E-04	-1,000E-03	-1,000E-03	-1,000E-03	-1,000E-03	-1,100E-03	-1,100E-03	-1,100E-03
N°222	-8,000E-04	-6,000E-04	-7,000E-04	-8,000E-04	-8,000E-04	-8,000E-04	-8,000E-04	-8,000E-04	-8,000E-04
N°223	-1,500E-03	-1,100E-03	-1,100E-03	-1,100E-03	-1,100E-03	-1,100E-03	-1,100E-03	-1,000E-03	-1,100E-03
N°224	-1,400E-03	-1,000E-03	-1,100E-03	-1,100E-03	-1,000E-03	-1,000E-03	-1,000E-03	-1,000E-03	-1,000E-03
N225	-1,700E-03	-1,100E-03	-1,100E-03	-1,100E-03	-1,100E-03	-1,000E-03	-1,000E-03	-1,000E-03	-1,100E-03
N°226(OFF)	-6,000E-04	-1,000E-04	-2,000E-04	-2,000E-04	-2,000E-04	-1,000E-04	-2,000E-04	-1,000E-04	-3,000E-04

7.11. Ibias+ (A) Out1



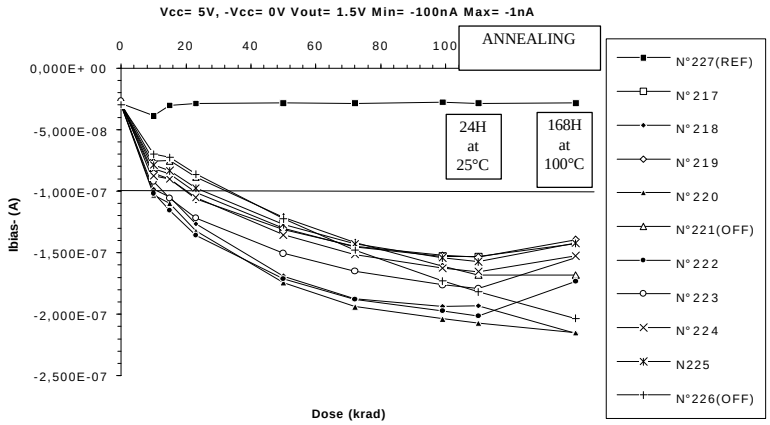
Ibias+ (A)	Vcc=5V, -Vcc=0V Vout=1.5V Min=-100nA Max=-1nA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	-3,138E-08	-3,196E-08	-2,894E-08	-2,873E-08	-2,866E-08	-2,888E-08	-2,808E-08	-2,880E-08	-2,849E-08
N°217	-3,179E-08	-7,866E-08	-8,843E-08	-1,071E-07	-1,505E-07	-1,783E-07	-1,979E-07	-1,904E-07	-1,497E-07
N°218	-3,264E-08	-8,948E-08	-1,044E-07	-1,297E-07	-1,884E-07	-2,189E-07	-2,363E-07	-2,339E-07	-2,052E-07
N°219	-3,208E-08	-7,930E-08	-9,034E-08	-1,092E-07	-1,523E-07	-1,785E-07	-2,006E-07	-1,999E-07	-1,528E-07
N°220	-3,216E-08	-8,510E-08	-9,817E-08	-1,210E-07	-1,751E-07	-2,047E-07	-2,248E-07	-2,245E-07	-1,917E-07
N°221(OFF)	-3,169E-08	-6,532E-08	-7,435E-08	-8,868E-08	-1,210E-07	-1,408E-07	-1,580E-07	-1,650E-07	-1,581E-07
N°222	-3,137E-08	-9,460E-08	-1,101E-07	-1,344E-07	-1,906E-07	-2,225E-07	-2,475E-07	-2,467E-07	-1,697E-07
N°223	-2,924E-08	-8,929E-08	-1,013E-07	-1,223E-07	-1,710E-07	-2,001E-07	-2,257E-07	-2,246E-07	-1,560E-07
N°224	-3,224E-08	-7,481E-08	-8,561E-08	-1,032E-07	-1,459E-07	-1,739E-07	-1,971E-07	-1,957E-07	-1,520E-07
N225	-3,154E-08	-7,032E-08	-7,999E-08	-9,669E-08	-1,375E-07	-1,628E-07	-1,853E-07	-1,842E-07	-1,358E-07
N°226(OFF)	-3,226E-08	-6,264E-08	-6,989E-08	-8,378E-08	-1,189E-07	-1,424E-07	-1,653E-07	-1,727E-07	-1,870E-07

7.12. Ibias+ (A) Out3



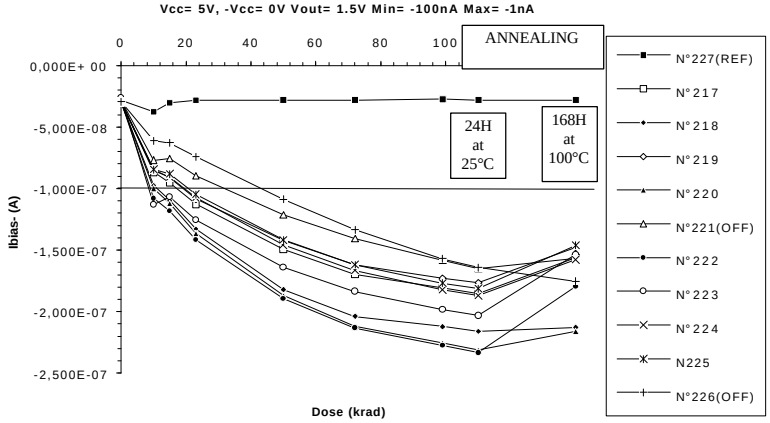
Ibias+ (A)	Vcc=5V, -Vcc=0V Vout=1.5V Min=-100nA Max=-1nA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	-2,837E-08	-3,370E-08	-2,839E-08	-2,770E-08	-2,762E-08	-2,773E-08	-2,696E-08	-2,765E-08	-2,745E-08
N°217	-2,902E-08	-8,660E-08	-9,588E-08	-1,156E-07	-1,560E-07	-1,788E-07	-1,916E-07	-1,958E-07	-1,650E-07
N°218	-2,988E-08	-1,010E-07	-1,164E-07	-1,447E-07	-2,044E-07	-2,316E-07	-2,413E-07	-2,455E-07	-2,384E-07
N°219	-2,853E-08	-8,035E-08	-8,737E-08	-1,056E-07	-1,415E-07	-1,626E-07	-1,748E-07	-1,783E-07	-1,484E-07
N°220	-2,969E-08	-9,937E-08	-1,137E-07	-1,410E-07	-1,994E-07	-2,295E-07	-2,460E-07	-2,523E-07	-2,287E-07
N°221(OFF)	-2,804E-08	-7,026E-08	-7,525E-08	-8,952E-08	-1,222E-07	-1,429E-07	-1,615E-07	-1,687E-07	-1,645E-07
N°222	-2,831E-08	-1,015E-07	-1,141E-07	-1,386E-07	-1,870E-07	-2,121E-07	-2,278E-07	-2,337E-07	-1,809E-07
N°223	-2,614E-08	-9,248E-08	-1,037E-07	-1,226E-07	-1,612E-07	-1,816E-07	-1,964E-07	-2,015E-07	-1,535E-07
N°224	-2,868E-08	-8,127E-08	-9,130E-08	-1,101E-07	-1,525E-07	-1,763E-07	-1,948E-07	-1,999E-07	-1,688E-07
N225	-2,910E-08	-8,084E-08	-8,837E-08	-1,062E-07	-1,470E-07	-1,695E-07	-1,879E-07	-1,923E-07	-1,552E-07
N°226(OFF)	-2,988E-08	-6,208E-08	-6,378E-08	-7,618E-08	-1,128E-07	-1,404E-07	-1,676E-07	-1,752E-07	-1,906E-07

7.13. Ibias- (A) Out1



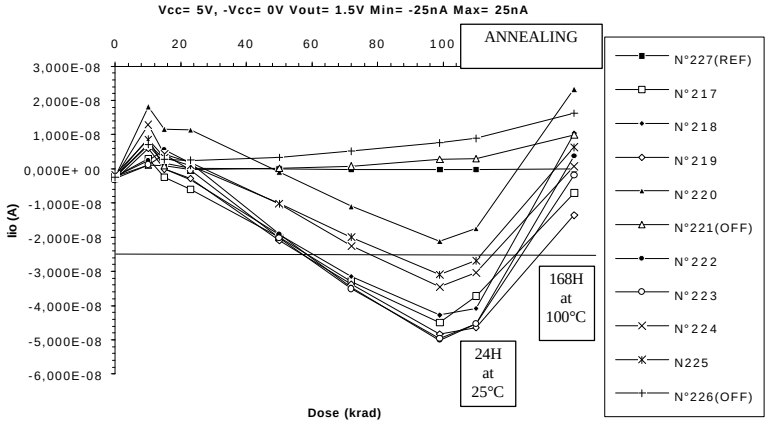
Ibias- (A)	Vcc=5V, -Vcc=0V Vout=1.5V Min=-100nA Max=-1nA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	-2,897E-08	-3,887E-08	-3,060E-08	-2,885E-08	-2,855E-08	-2,867E-08	-2,788E-08	-2,858E-08	-2,853E-08
N°217	-2,949E-08	-8,162E-08	-8,597E-08	-1,011E-07	-1,304E-07	-1,453E-07	-1,529E-07	-1,532E-07	-1,426E-07
N°218	-3,028E-08	-9,853E-08	-1,045E-07	-1,265E-07	-1,691E-07	-1,874E-07	-1,935E-07	-1,930E-07	-2,155E-07
N°219	-2,893E-08	-8,532E-08	-9,027E-08	-1,064E-07	-1,313E-07	-1,448E-07	-1,523E-07	-1,535E-07	-1,393E-07
N°220	-2,965E-08	-1,033E-07	-1,098E-07	-1,324E-07	-1,742E-07	-1,937E-07	-2,037E-07	-2,071E-07	-2,149E-07
N°221(OFF)	-2,888E-08	-7,560E-08	-7,523E-08	-8,839E-08	-1,212E-07	-1,415E-07	-1,608E-07	-1,680E-07	-1,681E-07
N°222	-2,912E-08	-1,018E-07	-1,157E-07	-1,359E-07	-1,714E-07	-1,879E-07	-1,974E-07	-2,014E-07	-1,734E-07
N°223	-2,707E-08	-9,204E-08	-1,057E-07	-1,218E-07	-1,507E-07	-1,650E-07	-1,762E-07	-1,793E-07	-1,541E-07
N°224	-2,983E-08	-8,770E-08	-8,995E-08	-1,051E-07	-1,356E-07	-1,513E-07	-1,626E-07	-1,653E-07	-1,527E-07
N225	-2,985E-08	-7,886E-08	-8,327E-08	-9,768E-08	-1,273E-07	-1,428E-07	-1,543E-07	-1,573E-07	-1,421E-07
N°226(OFF)	-2,977E-08	-6,983E-08	-7,261E-08	-8,626E-08	-1,223E-07	-1,476E-07	-1,730E-07	-1,816E-07	-2,033E-07

7.14. Ibias- (A) Out3



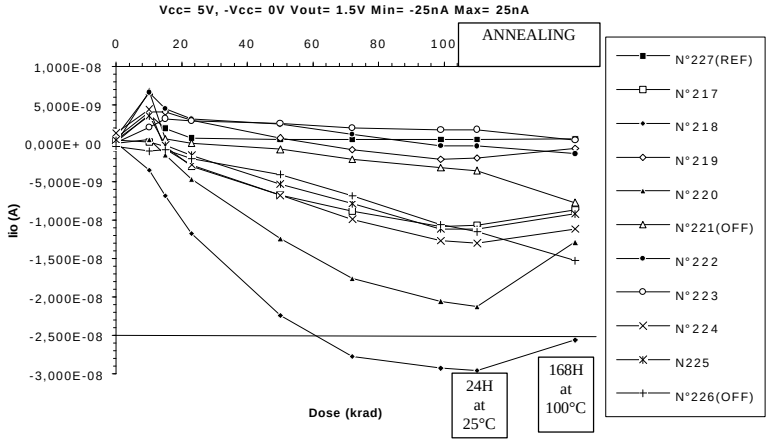
Ibias- (A)	Vcc=5V, -Vcc=0V Vout=1.5V Min=-100nA Max=-1nA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	-2,853E-08	-3,740E-08	-3,031E-08	-2,837E-08	-2,814E-08	-2,819E-08	-2,742E-08	-2,814E-08	-2,805E-08
N°217	-2,941E-08	-8,678E-08	-9,546E-08	-1,126E-07	-1,493E-07	-1,699E-07	-1,807E-07	-1,851E-07	-1,563E-07
N°218	-2,999E-08	-9,751E-08	-1,096E-07	-1,329E-07	-1,820E-07	-2,039E-07	-2,120E-07	-2,159E-07	-2,128E-07
N°219	-2,918E-08	-8,444E-08	-9,144E-08	-1,086E-07	-1,421E-07	-1,618E-07	-1,727E-07	-1,763E-07	-1,477E-07
N°220	-2,966E-08	-9,987E-08	-1,122E-07	-1,363E-07	-1,871E-07	-2,120E-07	-2,254E-07	-2,311E-07	-2,158E-07
N°221(OFF)	-2,805E-08	-7,697E-08	-7,579E-08	-8,954E-08	-1,214E-07	-1,408E-07	-1,583E-07	-1,651E-07	-1,568E-07
N°222	-2,910E-08	-1,081E-07	-1,185E-07	-1,417E-07	-1,894E-07	-2,132E-07	-2,274E-07	-2,333E-07	-1,795E-07
N°223	-2,621E-08	-1,131E-07	-1,068E-07	-1,255E-07	-1,638E-07	-1,835E-07	-1,981E-07	-2,032E-07	-1,538E-07
N°224	-3,001E-08	-8,565E-08	-9,052E-08	-1,073E-07	-1,457E-07	-1,664E-07	-1,821E-07	-1,869E-07	-1,576E-07
N225	-2,954E-08	-8,438E-08	-8,812E-08	-1,046E-07	-1,417E-07	-1,617E-07	-1,768E-07	-1,811E-07	-1,461E-07
N°226(OFF)	-2,948E-08	-6,105E-08	-6,289E-08	-7,412E-08	-1,087E-07	-1,335E-07	-1,570E-07	-1,638E-07	-1,753E-07
average	-2,914E-08	-9,498E-08	-1,016E-07	-1,212E-07	-1,626E-07	-1,841E-07	-1,969E-07	-2,016E-07	-1,712E-07
s	1,229E-09	1,139E-08	1,155E-08	1,466E-08	2,076E-08	2,246E-08	2,218E-08	2,277E-08	2,849E-08
avg+3*s	-2,545E-08	-6,080E-08	-6,692E-08	-7,720E-08	-1,004E-07	-1,167E-07	-1,304E-07	-1,333E-07	-8,574E-08
avg-3*s	-3,282E-08	-1,292E-07	-1,362E-07	-1,652E-07	-2,249E-07	-2,514E-07	-2,634E-07	-2,699E-07	-2,567E-07

7.15. Iio (A) Out1



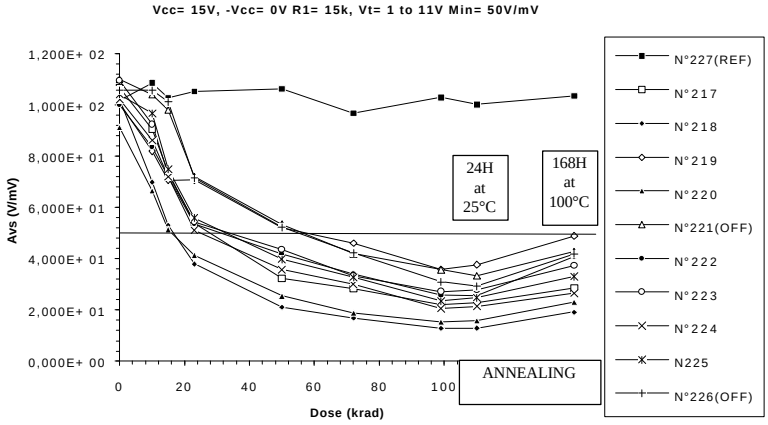
Iio (A)	Vcc=5V, -Vcc=0V Vout=1.5V Min=-25nA Max=25nA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	-2,408E-09	6,911E-09	1,656E-09	1,150E-10	-1,070E-10	-2,030E-10	-2,010E-10	-2,270E-10	4,500E-11
N°217	-2,295E-09	2,962E-09	-2,463E-09	-6,040E-09	-2,011E-08	-3,292E-08	-4,495E-08	-3,719E-08	-7,090E-09
N°218	-2,364E-09	9,053E-09	1,000E-11	-3,140E-09	-1,923E-08	-3,148E-08	-4,277E-08	-4,084E-08	1,034E-08
N°219	-3,153E-09	6,019E-09	-7,000E-11	-2,860E-09	-2,103E-08	-3,375E-08	-4,830E-08	-4,641E-08	-1,357E-08
N°220	-2,512E-09	1,821E-08	1,161E-08	1,138E-08	-8,700E-10	-1,096E-08	-2,113E-08	-1,743E-08	2,327E-08
N°221(OFF)	-2,815E-09	1,028E-09	8,790E-10	-2,910E-10	2,100E-10	7,800E-10	2,790E-09	3,020E-09	9,990E-09
N°222	-2,244E-09	2,339E-09	5,580E-09	1,570E-09	-1,916E-08	-3,460E-08	-5,010E-08	-4,531E-08	3,750E-09
N°223	-2,178E-09	1,151E-09	4,310E-09	-4,600E-10	-2,031E-08	-3,509E-08	-4,956E-08	-4,527E-08	-1,900E-09
N°224	-2,408E-09	1,288E-08	4,347E-09	1,870E-09	-1,035E-08	-2,256E-08	-3,450E-08	-3,035E-08	6,800E-10
N225	-1,692E-09	8,540E-09	3,272E-09	9,900E-10	-1,021E-08	-1,997E-08	-3,093E-08	-2,687E-08	6,310E-09
N°226(OFF)	-2,492E-09	7,190E-09	2,721E-09	2,477E-09	3,370E-09	5,280E-09	7,660E-09	8,950E-09	1,635E-08
average	-2,356E-09	7,644E-09	3,325E-09	4,138E-10	-1,516E-08	-2,767E-08	-4,028E-08	-3,621E-08	2,724E-09
s	4,055E-10	5,815E-09	4,339E-09	5,207E-09	7,269E-09	8,838E-09	1,044E-08	1,046E-08	1,122E-08
avg+3*s	-1,139E-09	2,509E-08	1,634E-08	1,604E-08	6,649E-09	-1,153E-09	-8,971E-09	-4,835E-09	3,639E-08
avg-3*s	-3,572E-09	-9,801E-09	-9,691E-09	-1,521E-08	-3,697E-08	-5,418E-08	-7,159E-08	-6,758E-08	-3,094E-08

7.16. Iio (A) Out3



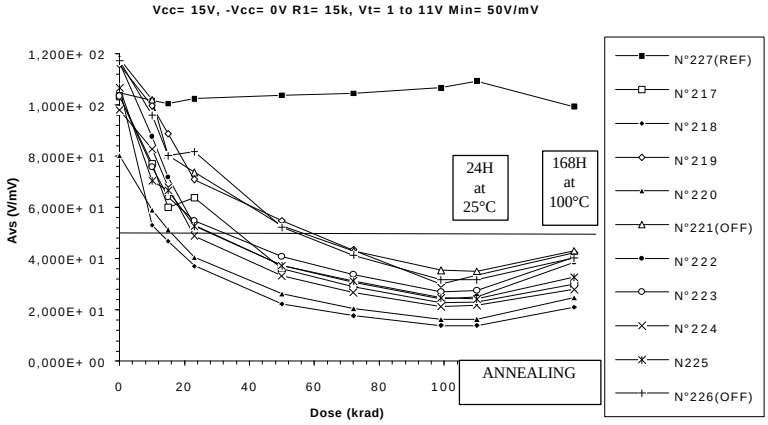
Iio (A)	Vcc=5V, -Vcc=0V Vout=1.5V Min=-25nA Max=25nA								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	1,590E-10	3,702E-09	1,926E-09	6,740E-10	5,180E-10	4,540E-10	4,530E-10	4,820E-10	5,950E-10
N°217	3,910E-10	1,810E-10	-4,200E-10	-3,000E-09	-6,740E-09	-8,820E-09	-1,085E-08	-1,067E-08	-8,690E-09
N°218	1,080E-10	-3,500E-09	-6,810E-09	-1,174E-08	-2,239E-08	-2,770E-08	-2,926E-08	-2,956E-08	-2,559E-08
N°219	6,460E-10	4,082E-09	4,071E-09	2,970E-09	6,700E-10	-8,100E-10	-2,120E-09	-1,950E-09	-7,000E-10
N°220	-3,400E-11	5,000E-10	-1,530E-09	-4,680E-09	-1,240E-08	-1,755E-08	-2,054E-08	-2,121E-08	-1,286E-08
N°221(OFF)	1,200E-11	6,704E-09	5,470E-10	1,400E-11	-7,800E-10	-2,090E-09	-3,150E-09	-3,570E-09	-7,720E-09
N°222	7,910E-10	6,570E-09	4,460E-09	3,140E-09	2,440E-09	1,140E-09	-3,500E-10	-3,800E-10	-1,380E-09
N°223	6,600E-11	2,063E-09	3,160E-09	2,870E-09	2,560E-09	1,970E-09	1,720E-09	1,770E-09	3,700E-10
N°224	1,333E-09	4,388E-09	-7,800E-10	-2,820E-09	-6,790E-09	-9,890E-09	-1,267E-08	-1,298E-08	-1,115E-08
N225	4,390E-10	3,549E-09	-2,570E-10	-1,570E-09	-5,310E-09	-7,840E-09	-1,113E-08	-1,116E-08	-9,150E-09
N°226(OFF)	-4,070E-10	-1,029E-09	-8,870E-10	-2,052E-09	-4,080E-09	-6,830E-09	-1,057E-08	-1,147E-08	-1,524E-08
average	4,675E-10	2,229E-09	2,368E-10	-1,854E-09	-5,995E-09	-8,688E-09	-1,065E-08	-1,077E-08	-8,644E-09
s	4,526E-10	3,133E-09	3,695E-09	5,051E-09	8,454E-09	1,010E-08	1,056E-08	1,076E-08	8,524E-09
avg+3*s	1,825E-09	1,163E-08	1,132E-08	1,330E-08	1,937E-08	2,162E-08	2,103E-08	2,151E-08	1,693E-08
avg-3*s	-8,904E-10	-7,170E-09	-1,085E-08	-1,701E-08	-3,136E-08	-3,899E-08	-4,233E-08	-4,304E-08	-3,422E-08

7.17. Avs (V/mV) Out1



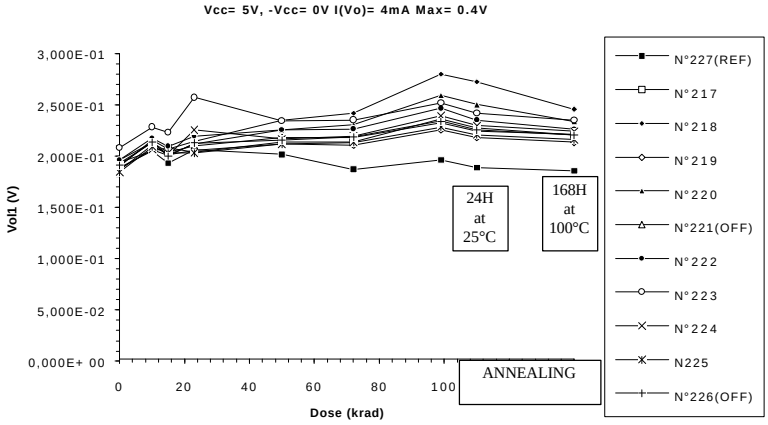
Avs (V/mV)	Vcc=15V, -Vcc=0V R1=15k, Vt=1 to 11V Min=50V/mV								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	1,018E+02	1,085E+02	1,027E+02	1,052E+02	1,062E+02	9,671E+01	1,029E+02	1,001E+02	1,035E+02
N°217	1,066E+02	9,054E+01	7,364E+01	5,380E+01	3,231E+01	2,837E+01	2,205E+01	2,278E+01	2,848E+01
N°218	1,023E+02	6,989E+01	5,309E+01	3,795E+01	2,113E+01	1,677E+01	1,281E+01	1,298E+01	1,924E+01
N°219	1,008E+02	8,189E+01	7,063E+01	7,069E+01	5,202E+01	4,605E+01	3,592E+01	3,763E+01	4,886E+01
N°220	9,117E+01	6,649E+01	5,139E+01	4,135E+01	2,553E+01	1,892E+01	1,543E+01	1,577E+01	2,300E+01
N°221(OFF)	1,100E+02	1,040E+02	9,800E+01	7,202E+01	5,340E+01	4,194E+01	3,575E+01	3,335E+01	4,290E+01
N°222	9,999E+01	8,355E+01	7,211E+01	5,367E+01	4,171E+01	3,396E+01	2,574E+01	2,555E+01	4,092E+01
N°223	1,094E+02	9,242E+01	7,297E+01	5,437E+01	4,348E+01	3,332E+01	2,720E+01	2,795E+01	3,732E+01
N°224	1,021E+02	8,620E+01	7,190E+01	5,117E+01	3,575E+01	3,000E+01	2,058E+01	2,147E+01	2,649E+01
N225	1,041E+02	9,669E+01	7,490E+01	5,584E+01	3,984E+01	3,273E+01	2,349E+01	2,489E+01	3,319E+01
N°226(OFF)	1,057E+02	1,057E+02	1,012E+02	7,143E+01	5,232E+01	4,222E+01	3,097E+01	2,944E+01	4,192E+01
average	1,021E+02	8,346E+01	6,758E+01	5,236E+01	3,647E+01	3,002E+01	2,290E+01	2,363E+01	3,219E+01
s	5,385E+00	1,061E+01	9,561E+00	9,901E+00	1,002E+01	9,198E+00	7,173E+00	7,564E+00	9,855E+00
avg+3*s	1,182E+02	1,153E+02	9,626E+01	8,206E+01	6,653E+01	5,761E+01	4,442E+01	4,632E+01	6,175E+01
avg-3*s	8,590E+01	5,164E+01	3,890E+01	2,265E+01	6,416E+00	2,421E+00	1,384E+00	9,347E-01	2,623E+00

7.18. Avs (V/mV) Out3



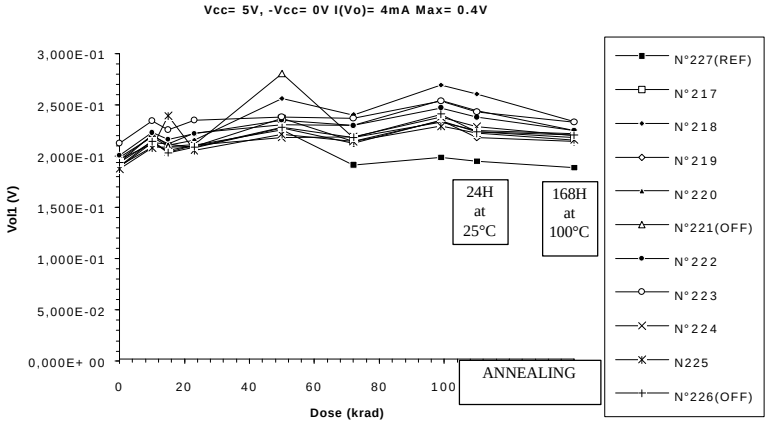
Avs (V/mV)	Vcc=15V, -Vcc=0V R1=15k, Vt=1 to 11V Min=50V/mV								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	1,047E+02	1,017E+02	1,004E+02	1,024E+02	1,036E+02	1,044E+02	1,066E+02	1,093E+02	9,933E+01
N°217	1,034E+02	7,695E+01	6,009E+01	6,386E+01	3,610E+01	2,921E+01	2,294E+01	2,316E+01	3,004E+01
N°218	1,068E+02	5,302E+01	4,690E+01	3,720E+01	2,242E+01	1,775E+01	1,398E+01	1,394E+01	2,109E+01
N°219	1,157E+02	9,958E+01	8,876E+01	7,087E+01	5,480E+01	4,343E+01	3,020E+01	3,350E+01	4,226E+01
N°220	8,015E+01	5,902E+01	5,131E+01	4,047E+01	2,637E+01	2,063E+01	1,630E+01	1,639E+01	2,485E+01
N°221(OFF)	1,179E+02	1,019E+02	8,023E+01	7,363E+01	5,283E+01	4,313E+01	3,550E+01	3,511E+01	4,308E+01
N°222	1,165E+02	8,759E+01	7,186E+01	5,306E+01	3,729E+01	3,092E+01	2,435E+01	2,519E+01	3,866E+01
N°223	1,034E+02	7,575E+01	6,408E+01	5,492E+01	4,074E+01	3,377E+01	2,701E+01	2,758E+01	4,052E+01
N°224	9,798E+01	8,286E+01	6,797E+01	4,886E+01	3,325E+01	2,682E+01	2,142E+01	2,189E+01	2,800E+01
N225	1,066E+02	7,038E+01	6,659E+01	5,269E+01	3,731E+01	3,132E+01	2,474E+01	2,425E+01	3,282E+01
N°226(OFF)	1,171E+02	9,595E+01	8,021E+01	8,166E+01	5,229E+01	4,138E+01	3,182E+01	3,179E+01	4,031E+01
average	1,038E+02	7,564E+01	6,470E+01	5,274E+01	3,604E+01	2,923E+01	2,262E+01	2,324E+01	3,228E+01
s	1,142E+01	1,505E+01	1,289E+01	1,111E+01	9,739E+00	7,938E+00	5,350E+00	6,143E+00	7,674E+00
avg+3*s	1,381E+02	1,208E+02	1,034E+02	8,608E+01	6,525E+01	5,304E+01	3,867E+01	4,167E+01	5,530E+01
avg-3*s	6,954E+01	3,050E+01	2,604E+01	1,941E+01	6,817E+00	5,419E+00	6,568E+00	4,808E+00	9,257E+00

7.19. Vol1 (V) Out1



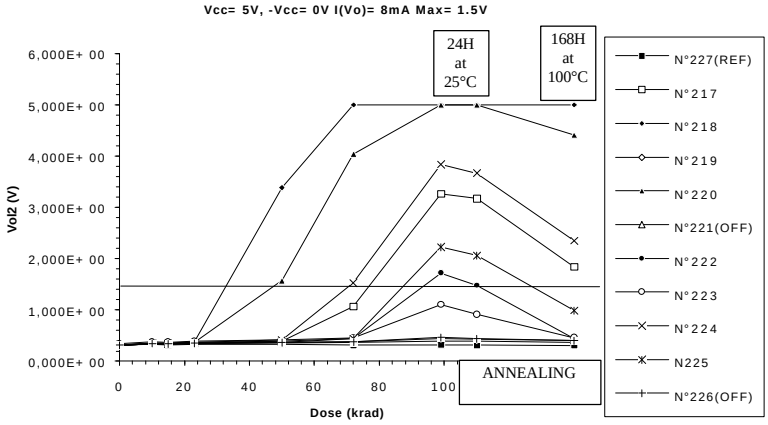
Vol1 (V)	Vcc=5V, -Vcc=0V I(Vo)=4mA Max=0.4V								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	1,938E-01	2,049E-01	1,932E-01	2,063E-01	2,017E-01	1,872E-01	1,962E-01	1,887E-01	1,857E-01
N°217	1,891E-01	2,052E-01	2,082E-01	2,036E-01	2,139E-01	2,137E-01	2,359E-01	2,274E-01	2,206E-01
N°218	1,900E-01	2,157E-01	2,066E-01	2,146E-01	2,350E-01	2,420E-01	2,799E-01	2,724E-01	2,457E-01
N°219	1,932E-01	2,134E-01	2,011E-01	2,058E-01	2,121E-01	2,107E-01	2,254E-01	2,181E-01	2,136E-01
N°220	1,865E-01	2,108E-01	2,015E-01	2,121E-01	2,255E-01	2,305E-01	2,590E-01	2,504E-01	2,336E-01
N°221(OFF)	1,961E-01	2,131E-01	2,036E-01	2,102E-01	2,180E-01	2,184E-01	2,326E-01	2,243E-01	2,211E-01
N°222	1,964E-01	2,174E-01	2,095E-01	2,195E-01	2,253E-01	2,263E-01	2,466E-01	2,351E-01	2,261E-01
N°223	2,081E-01	2,282E-01	2,232E-01	2,572E-01	2,344E-01	2,350E-01	2,516E-01	2,419E-01	2,348E-01
N°224	1,876E-01	2,063E-01	2,003E-01	2,256E-01	2,168E-01	2,196E-01	2,393E-01	2,296E-01	2,241E-01
N225	1,845E-01	2,090E-01	2,031E-01	2,033E-01	2,116E-01	2,134E-01	2,283E-01	2,208E-01	2,161E-01
N°226(OFF)	1,913E-01	2,139E-01	2,001E-01	2,127E-01	2,154E-01	2,187E-01	2,340E-01	2,255E-01	2,207E-01
average	1,919E-01	2,133E-01	2,067E-01	2,177E-01	2,218E-01	2,239E-01	2,458E-01	2,370E-01	2,268E-01
s	7,543E-03	7,406E-03	7,509E-03	1,779E-02	9,595E-03	1,138E-02	1,786E-02	1,784E-02	1,071E-02
avg+3*s	2,146E-01	2,355E-01	2,292E-01	2,711E-01	2,506E-01	2,581E-01	2,993E-01	2,905E-01	2,589E-01
avg-3*s	1,693E-01	1,910E-01	1,842E-01	1,644E-01	1,930E-01	1,897E-01	1,922E-01	1,835E-01	1,947E-01

7.20. Vol1 (V) Out3



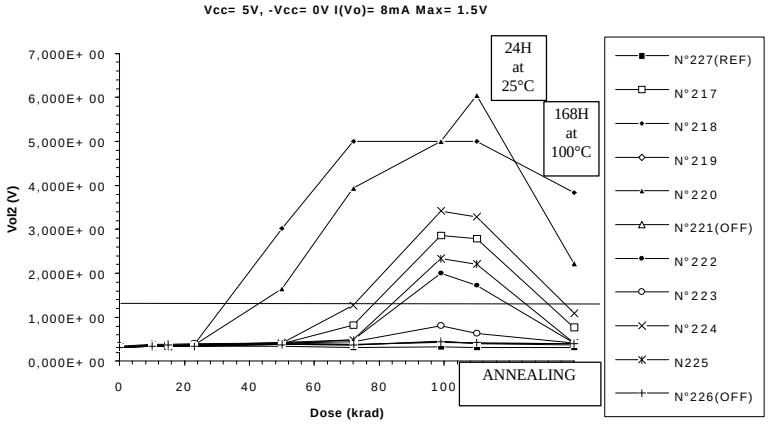
Vol1 (V)	Vcc=5V, -Vcc=0V I(Vo)=4mA Max=0.4V								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	1,966E-01	2,118E-01	2,055E-01	2,104E-01	2,257E-01	1,914E-01	1,990E-01	1,951E-01	1,889E-01
N°217	1,908E-01	2,090E-01	2,087E-01	2,095E-01	2,365E-01	2,142E-01	2,346E-01	2,238E-01	2,180E-01
N°218	1,936E-01	2,204E-01	2,107E-01	2,158E-01	2,561E-01	2,402E-01	2,695E-01	2,608E-01	2,339E-01
N°219	1,963E-01	2,197E-01	2,118E-01	2,084E-01	2,273E-01	2,125E-01	2,351E-01	2,180E-01	2,143E-01
N°220	1,896E-01	2,128E-01	2,118E-01	2,227E-01	2,303E-01	2,300E-01	2,545E-01	2,446E-01	2,248E-01
N°221(OFF)	1,989E-01	2,186E-01	2,091E-01	2,110E-01	2,805E-01	2,182E-01	2,332E-01	2,249E-01	2,221E-01
N°222	2,005E-01	2,229E-01	2,163E-01	2,218E-01	2,349E-01	2,297E-01	2,471E-01	2,378E-01	2,247E-01
N°223	2,124E-01	2,341E-01	2,256E-01	2,349E-01	2,381E-01	2,367E-01	2,535E-01	2,429E-01	2,328E-01
N°224	1,898E-01	2,149E-01	2,037E-01	2,104E-01	2,179E-01	2,190E-01	2,381E-01	2,288E-01	2,200E-01
N225	1,875E-01	2,081E-01	2,392E-01	2,057E-01	2,213E-01	2,145E-01	2,291E-01	2,225E-01	2,159E-01
N°226(OFF)	1,937E-01	2,144E-01	2,034E-01	2,090E-01	2,280E-01	2,182E-01	2,408E-01	2,236E-01	2,205E-01
average	1,951E-01	2,177E-01	2,160E-01	2,162E-01	2,328E-01	2,246E-01	2,452E-01	2,349E-01	2,231E-01
s	8,165E-03	8,510E-03	1,133E-02	9,806E-03	1,183E-02	1,091E-02	1,349E-02	1,433E-02	7,378E-03
avg+3*s	2,196E-01	2,433E-01	2,500E-01	2,456E-01	2,683E-01	2,573E-01	2,857E-01	2,779E-01	2,452E-01
avg-3*s	1,706E-01	1,922E-01	1,820E-01	1,867E-01	1,973E-01	1,919E-01	2,047E-01	1,919E-01	2,009E-01

7.21. Vol2 (V) Out1



Vol2 (V)	Vcc=5V, -Vcc=0V I(Vo)=8mA Max=1.5V								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	3,192E-01	3,339E-01	3,189E-01	3,316E-01	3,314E-01	3,126E-01	3,231E-01	3,136E-01	3,105E-01
N°217	3,114E-01	3,378E-01	3,483E-01	3,442E-01	3,943E-01	1,069E+00	3,261E+00	3,172E+00	1,844E+00
N°218	3,131E-01	3,592E-01	3,534E-01	3,856E-01	3,386E+00	5,001E+00	5,001E+00	5,001E+00	5,001E+00
N°219	3,177E-01	3,484E-01	3,432E-01	3,588E-01	3,555E-01	3,629E-01	3,994E-01	3,891E-01	3,740E-01
N°220	3,071E-01	3,476E-01	3,395E-01	3,685E-01	1,573E+00	4,041E+00	5,001E+00	5,001E+00	4,413E+00
N°221(OFF)	3,232E-01	3,481E-01	3,377E-01	3,485E-01	3,714E-01	3,844E-01	4,478E-01	4,287E-01	4,007E-01
N°222	3,237E-01	3,564E-01	3,487E-01	3,711E-01	3,970E-01	4,488E-01	1,720E+00	1,483E+00	4,471E-01
N°223	3,434E-01	3,759E-01	3,734E-01	3,972E-01	4,143E-01	4,501E-01	1,108E+00	9,113E-01	4,593E-01
N°224	3,096E-01	3,395E-01	3,356E-01	3,634E-01	4,135E-01	1,524E+00	3,835E+00	3,665E+00	2,351E+00
N225	3,046E-01	3,425E-01	3,358E-01	3,400E-01	3,694E-01	4,475E-01	2,226E+00	2,061E+00	9,904E-01
N°226(OFF)	3,153E-01	3,480E-01	3,367E-01	3,588E-01	3,632E-01	3,820E-01	4,696E-01	4,432E-01	4,036E-01
average	3,163E-01	3,509E-01	3,472E-01	3,661E-01	9,129E-01	1,668E+00	2,819E+00	2,710E+00	1,985E+00
s	1,249E-02	1,261E-02	1,235E-02	1,927E-02	1,082E+00	1,824E+00	1,736E+00	1,780E+00	1,829E+00
avg+3*s	3,538E-01	3,887E-01	3,843E-01	4,239E-01	4,158E+00	7,139E+00	8,026E+00	8,050E+00	7,473E+00
avg-3*s	2,789E-01	3,131E-01	3,102E-01	3,083E-01	-2,33E+00	-3,80E+00	-2,39E+00	-2,63E+00	-3,50E+00

7.22. Vol2 (V) Out3



Vol2 (V)	Vcc=5V, -Vcc=0V I(Vo)=8mA Max=1.5V								
Dose (krad)	**0**	**10**	**15**	**23**	**50**	**72**	**99**	**24H at 25°C**	**168H at 100°C**
N°227(REF)	3,227E-01	3,444E-01	3,378E-01	3,443E-01	3,473E-01	3,181E-01	3,277E-01	3,186E-01	3,147E-01
N°217	3,130E-01	3,435E-01	3,490E-01	3,749E-01	4,058E-01	8,260E-01	2,859E+00	2,783E+00	7,684E-01
N°218	3,178E-01	3,671E-01	3,610E-01	3,887E-01	3,016E+00	5,001E+00	5,001E+00	5,001E+00	3,837E+00
N°219	3,219E-01	3,582E-01	3,541E-01	3,451E-01	3,809E-01	3,673E-01	4,514E-01	3,940E-01	3,707E-01
N°220	3,113E-01	3,520E-01	3,603E-01	3,771E-01	1,652E+00	3,937E+00	5,001E+00	6,047E+00	2,227E+00
N°221(OFF)	3,266E-01	3,558E-01	3,487E-01	3,489E-01	4,167E-01	3,803E-01	4,330E-01	4,196E-01	3,985E-01
N°222	3,291E-01	3,657E-01	3,602E-01	3,729E-01	4,278E-01	4,916E-01	2,003E+00	1,729E+00	4,093E-01
N°223	3,489E-01	3,847E-01	3,893E-01	3,944E-01	4,169E-01	4,452E-01	8,085E-01	6,376E-01	4,111E-01
N°224	3,122E-01	3,537E-01	3,718E-01	3,718E-01	4,145E-01	1,276E+00	3,422E+00	3,284E+00	1,098E+00
N225	3,086E-01	3,410E-01	3,404E-01	3,447E-01	4,005E-01	4,931E-01	2,342E+00	2,209E+00	4,197E-01
N°226(OFF)	3,184E-01	3,482E-01	3,784E-01	3,438E-01	3,813E-01	3,769E-01	4,432E-01	4,202E-01	3,968E-01
average	3,204E-01	3,582E-01	3,608E-01	3,712E-01	8,893E-01	1,605E+00	2,736E+00	2,761E+00	1,193E+00
s	1,331E-02	1,418E-02	1,480E-02	1,805E-02	9,634E-01	1,814E+00	1,706E+00	1,985E+00	1,239E+00
avg+3*s	3,603E-01	4,008E-01	4,052E-01	4,253E-01	3,780E+00	7,047E+00	7,854E+00	8,714E+00	4,910E+00
avg-3*s	2,804E-01	3,157E-01	3,163E-01	3,171E-01	-2,00E+00	-3,84E+00	-2,38E+00	-3,19E+00	-2,52E+00

8. APPENDIX 1.
TOTAL DOSE IRRADIATION TEST PLAN

Component N° :217 at 227	Comp. Design. (Part type) : **LM139AJ**							Irradiation Specification : IPR02.001	
Gen Spec : Det Spec : 5962-9673801VCA Amend :	Evaluation : RVT : X							Project/Programme : AGLINE	
Family/Group :8/6 Technology : Bipolar	Functional Assignement : Quad Voltage Comparator							Package : DIL 14	
Manufacturer : NSC Address : Scotland	Irradiation Facility : Address : Montpellier							Test House : TRAD Address : Montpellier	
Radiation Source : **Cobalt 60**	Sample size : 11 Irradiation devices: 10 Control device : 1							Total dose level : 100 krad.	
EXPERIMENTAL STEPS :	1	2	3	4	5	6	7	8	
PROCESS	Irrad.	Irrad.	Irrad.	Irrad.	Irrad.	Irrad.	Irrad.	ANNEALING	
Dose per step [Krad(Si)]	0	10	5	8	27	25	25	24H	168H
Cumulative Dose[Krad(Si)]	0	10	15	23	50	75	100	25°C	100°C
Irradiation Conditions : Biased : Yes Biasing cond : Figure n°1	Irradiation Measurement interval : Biased : No Biasing cond : No							Annealings conditions : Biased : Yes Biasing cond : Figure n°1	
Remote testing : Yes In Situ testing : No Electr. test equipment	***BIAS CONDITIONS UNDER TEST:***								

	8 Parts Biased on 2 Parts Biased off.

9. APPENDIX 2.
MANUFACTURER DATA SHEET

N°	*Charesteristic*	*Symbol*	*Test Conditions*	*Limit*		*Unit*
				Min	*Max*	
1	Supply Curren	Icc1	Vcc=5V -Vcc=0V	-	2	mA
2	Supply Curren	Icc2	Vcc=30V -Vcc=0V	-	2	mA
3	Input Offset Voltage	Vio1	Vcc=30V -Vcc=0V	-2	2	mV
4	Input Offset Voltage	Vio2	Vcc=5V -Vcc=0V	-2	2	mV
5	Input Offset Current	Iio	Vcc=5V -Vcc=0V Vcm=0V Vout=1.5V	-25	25	nA
6	Input Bias Current +	Ib+	Vcc=5V -Vcc=0V Vcm=0V Vout=1.5V	-100	-1	nA
7	Input Bias Current -	Ib-	Vcc=5V -Vcc=0V Vcm=0V Vout=1.5V	-100	-1	nA
8	Voltage Gain	Avs	Vcc=15V -Vcc=0V R1>=15k Vt=1 to 11V	50	-	V/mV
9	Saturation Voltage	Vol1	Vcc=5V -Vcc=0V I(Vo)=4mA	-	0.4	V
10	Saturation Voltage	Vol2	Vcc=5V -Vcc=0V I(Vo)=8mA	-	1.5	V

P.I.T de la Pompignane. Rue de la vieille poste - Bat. T4. EMAIL: atrad@ibm.net
34055 MONTPELLIER cedex 1. Tel : (33) 04 99 52 68 99. Fax : (33) 04 99 52 68 98